

TABLE E1—FSTD QUALITY MANAGEMENT SYSTEM—Continued

Entry No.	QPS requirement	Information (reference)
E1.31.	A policy, process, or procedure specifying how the sponsor will track the length of time a component has been missing, malfunctioning, or inoperative (MMI), including:	§ 60.25(b)–(c), and QPS Appendices A, B, C, or D.
E1.31.a.	How the sponsor will post a list of MMI components in or adjacent to the FSTD.	
E1.31.b.	How the sponsor will notify the NSPM if the MMI has not been repaired or replaced within 30 days.*	
E1.32.	A policy, process, or procedure specifying how the sponsor will notify the NSPM and how the sponsor will seek requalification of the FSTD if the FSTD is moved and reinstalled in a different location.	§ 60.27(a)(3).
E1.33.	A policy, process, or procedure specifying how the sponsor will maintain control of the following: (The sponsor must specify how these records are maintained in plain language form or in coded form; but if the coded form is used, the sponsor must specify how the preservation and retrieval of information will be conducted.).	§ 60.31.
E1.33.a.	The MQTG and each amendment.	
E1.33.b.	A record of all FSTD modifications required by this part since the issuance of the original SOQ.	
E1.33.c.	Results of the qualification evaluations (initial and each upgrade) since the issuance of the original SOQ.	
E1.33.d.	Results of the objective tests conducted in accordance with this part for a period of 2 years.	
E1.33.e.	Results of the previous three continuing qualification evaluations, or the continuing qualification evaluations from the previous 2 years, whichever covers a longer period.	
E1.33.f.	Comments obtained in accordance with § 60.9(b);	
E1.33.g.	A record of all discrepancies entered in the discrepancy log over the previous 2 years, including the following:	
E1.33.g.1.	A list of the components or equipment that were or are missing, malfunctioning, or inoperative.	
E1.33.g.2.	The action taken to correct the discrepancy.	
E1.33.g.3.	The date the corrective action was taken.	
E1.33.g.4.	The identity of the person determining that the discrepancy has been corrected.	

* Note: If the sponsor has an approved discrepancy prioritization system, this item is satisfied by describing how discrepancies are prioritized, what actions are taken, and how the sponsor will notify the NSPM if the MMI has not been repaired or replaced within the specified timeframe.

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APPENDIX F TO PART 60—DEFINITIONS AND ABBREVIATIONS FOR FLIGHT SIMULATION TRAINING DEVICES

BEGIN INFORMATION

1. SOME OF THE DEFINITIONS PRESENTED BELOW ARE REPEATED FROM THE DEFINITIONS FOUND IN 14 CFR PART 1, AS INDICATED PARENTHETICALLY

END INFORMATION

BEGIN QPS REQUIREMENTS

2. DEFINITIONS

1st Segment—the portion of the takeoff profile from liftoff to gear retraction.

2nd Segment—the portion of the takeoff profile from after gear retraction to initial flap/slat retraction.

3rd Segment—the portion of the takeoff profile after flap/slat retraction is complete.

Aircraft Data Package—a combination of the various types of data used to design, program, manufacture, modify, and test the FSTD.

Airspeed—calibrated airspeed unless otherwise specified and expressed in terms of nautical miles per hour (knots).

Airport Model—

Class I. Whether modeling real world or fictional airports (or landing areas for helicopters), these airport models (or landing areas for helicopters) are those that meet the requirements of Table A3B or C3B, found in attachment 2 of Appendix A or C, as appropriate, are evaluated by the NSPM, and are listed on the SOQ.

Class II. Whether modeling real world or fictional airports (or landing areas for helicopters), these airport models (or landing areas for helicopters) are those models that are in excess of those used for simulator qualification at a specified level. The FSTD sponsor is responsible for determining that these models meet the requirements set out in Table A3C or C3C, found in attachment 2 of Appendix A or C, as appropriate.

Class III. This is a special class of airport model (or landing area for helicopters), used for specific purposes, and includes models that may be incomplete or inaccurate when viewed without restriction, but when appropriate limits are applied (e.g., “valid for use only in visibility conditions less than ½ statute mile or RVR2400 feet,” “valid for use only for approaches to Runway 22L and 22R”), those features that may be incomplete or inaccurate may not be able to be recognized as such by the crewmember being trained, tested, or checked. Class III airport models used for training, testing, or checking activities under this Chapter requires the certificate holder to submit to the TPAA an appropriate analysis of the skills, knowledge, and abilities necessary for competent performance of the task(s) in which this particular model is to be used, and requires TPAA acceptance of each Class III model.

Altitude—pressure altitude (meters or feet) unless specified otherwise.

Angle of Attack—the angle between the airplane longitudinal axis and the relative wind vector projected onto the airplane plane of symmetry.

Automatic Testing—FSTD testing where all stimuli are under computer control.

Bank—the airplane attitude with respect to or around the longitudinal axis, or roll angle (degrees).

Breakout—the force required at the pilot’s primary controls to achieve initial movement of the control position.

Certificate Holder—a person issued a certificate under parts 119, 141, or 142 of this chapter or a person holding an approved course of training for flight engineers in accordance with part 63 of this chapter.

Closed Loop Testing—a test method where the input stimuli are generated by controllers that drive the FSTD to follow a pre-defined target response.

Computer Controlled Aircraft—an aircraft where all pilot inputs to the control surfaces are transferred and augmented by computers.

Confined Area (helicopter operations)—an area where the flight of the helicopter is limited in some direction by terrain or the presence of natural or man-made obstructions (e.g., a clearing in the woods, a city street, or a road bordered by trees or power lines are regarded as confined areas).

Control Sweep—movement of the appropriate pilot controller from neutral to an extreme limit in one direction (Forward, Aft, Right, or Left), a continuous movement back through neutral to the opposite extreme position, and then a return to the neutral position.

Convertible FSTD—an FSTD in which hardware and software can be changed so that the FSTD becomes a replica of a different model, usually of the same type aircraft. The same FSTD platform, flight deck shell, motion system, visual system, computers, and peripheral equipment can be used in more than one simulation.

Critical Engine Parameter—the parameter that is the most accurate measure of propulsive force.

Deadband—the amount of movement of the input for a system for which there is no reaction in the output or state of the system observed.

Distance—the length of space between two points, expressed in terms of nautical miles unless otherwise specified.

Discrepancy—as used in this part, an aspect of the FSTD that is not correct with respect to the aircraft being simulated. This includes missing, malfunctioning, or inoperative components that are required to be present and operate correctly for training, evaluation, and experience functions to be creditable. It also includes errors in the documentation used to support the FSTD (e.g., MQTG errors, information missing from the MQTG, or required statements from appropriately qualified personnel).

Downgrade—a permanent change in the qualification level of an FSTD to a lower level.

Driven—a test method where the input stimulus or variable is positioned by automatic means, usually a computer input.

Electronic Copy of the MQTG—an electronic copy of the MQTG provided by an electronic scan presented in a format, acceptable to the NSPM.

Electronic Master Qualification Test Guide—an electronic version of the MQTG (eMQTG), where all objective data obtained from airplane testing, or another approved source, together with correlating objective test results obtained from the performance of the FSTD and a description of the equipment necessary to perform the evaluation for the initial and the continuing qualification evaluations is stored, archived, or presented in either reformatted or digitized electronic format.

Engine—as used in this part, the appliance or structure that supplies propulsive force for movement of the aircraft: i.e., The turbine engine for turbine powered aircraft; the turbine engine and propeller assembly for turbo-propeller powered aircraft; and the reciprocating engine and propeller assembly for reciprocating engine powered aircraft. For purposes of this part, engine failure is the failure of either the engine or propeller assembly to provide thrust higher than idle power thrust due to a failure of either the engine or the propeller assembly.

Evaluation—with respect to an individual, the checking, testing, or review associated with flight crewmember qualification, training, and certification under parts 61, 63, 121, or 135 of this chapter. With respect to an FSTD, the qualification activities for the device (e.g., the objective and subjective tests, the inspections, or the continuing qualification evaluations) associated with the requirements of this part.

Fictional Airport—a visual model of an airport that is a collection of “non-real world” terrain, instrument approach procedures, navigation aids, maps, and visual modeling detail sufficient to enable completion of an Airline Transport Pilot Certificate or Type Rating.

Flight Experience—recency of flight experience for landing credit purposes.

Flight Simulation Training Device (FSTD)—a full flight simulator (FFS) or a flight training device (FTD). (Part 1)

Flight Test Data—(a subset of objective data) aircraft data collected by the aircraft manufacturer or other acceptable data supplier during an aircraft flight test program.

Flight Training Device (FTD)—a replica of aircraft instruments, equipment, panels, and controls in an open flight deck area or an enclosed aircraft flight deck replica. It includes the equipment and computer programs necessary to represent aircraft (or set of aircraft) operations in ground and flight conditions having the full range of capabilities of the systems installed in the device as

described in part 60 of this chapter and the qualification performance standard (QPS) for a specific FTD qualification level. (Part 1)

Free Response—the response of the FSTD after completion of a control input or disturbance.

Frozen—a test condition where one or more variables are held constant with time.

FSTD Approval—the extent to which an FSTD may be used by a certificate holder as authorized by the FAA.

FSTD Directive—a document issued by the FAA to an FSTD sponsor requiring a modification to the FSTD due to a safety-of-flight issue and amending the qualification basis for the FSTD.

FSTD Latency—the additional time for the FSTD to respond to input that is beyond the response time of the aircraft.

FSTD Performance—the overall performance of the FSTD, including aircraft performance (e.g., thrust/drag relationships, climb, range) and flight and ground handling.

Full Flight Simulator (FFS)—a replica of a specific type, make, model, or series aircraft. It includes the equipment and computer programs necessary to represent aircraft operations in ground and flight conditions, a visual system providing an out-of-the-flight deck view, a system that provides cues at least equivalent to those of a three-degree-of-freedom motion system, and has the full range of capabilities of the systems installed in the device as described in part 60 of this chapter and the QPS for a specific FFS qualification level. (Part 1)

Gate Clutter—the static and moving ground traffic (e.g., other airplanes; tugs; power or baggage carts; fueling, catering, or cargo trucks; pedestrians) presented to pose a potential conflict with the simulated aircraft during ground operations around the point where the simulated airplane is to be parked between flights

Generic Airport Model—a Class III visual model that combines correct navigation aids for a real world airport with a visual model that does not depict that same airport.

Grandfathering—as used in this part, the practice of assigning a qualification basis for an FSTD based on the period of time during which a published set of standards governed the requirements for the initial and continuing qualification of FSTDs. Each FSTD manufactured during this specified period of time is “grandfathered” or held to the standards that were in effect during that time period. The grandfathered standards remain applicable to each FSTD manufactured during the stated time period regardless of any subsequent modification to those standards and regardless of the sponsor, as long as the FSTD remains qualified or is maintained in a non-qualified status in accordance with the specific requirements and time periods prescribed in this part.

Gross Weight—For objective test purposes:

Basic Operating Weight (BOW)—the empty weight of the aircraft plus the weight of the following: Normal oil quantity; lavatory servicing fluid; potable water; required crewmembers and their baggage; and emergency equipment.

Light Gross Weight—a weight chosen by the sponsor or data provider that is not more than 120% of the BOW of the aircraft being simulated or the minimum practical operating weight of the test aircraft.

Medium Gross Weight—a weight chosen by the sponsor or data provider that is within 10% of the average of the numerical values of the BOW and the maximum certificated gross weight.

Near Maximum Gross Weight—a weight chosen by the sponsor or data provider that is not less than the BOW of the aircraft being simulated plus 80% of the difference between the maximum certificated gross weight (either takeoff weight or landing weight, as appropriate for the test) and the BOW.

Ground Effect—the change in aerodynamic characteristics due to of the change in the airflow past the aircraft caused by the proximity of the earth's surface to the airplane.

Hands Off—a test maneuver conducted without pilot control inputs.

Hands On—a test maneuver conducted with pilot control inputs as required.

Heave—FSTD movement with respect to or along the vertical axis.

Height—the height above ground level (or AGL) expressed in meters or feet.

“In Use” Runway—as used in this part, the runway that is currently selected, able to be used for takeoffs and landings, and has the surface lighting and markings required by this part. Also known as the “active” runway.

Integrated Testing—testing of the FSTD so that all aircraft system models are active and contribute appropriately to the results. With integrated testing, none of the models used are substituted with models or other algorithms intended for testing only.

Irreversible Control System—a control system where movement of the control surface will not backdrive the pilot's control on the flight deck.

Locked—a test condition where one or more variables are held constant with time.

Manual Testing—FSTD testing conducted without computer inputs except for initial setup, and all modules of the simulation are active.

Master Qualification Test Guide (MQTG)—the FAA-approved Qualification Test Guide with the addition of the FAA-witnessed test results, applicable to each individual FSTD.

Medium—the normal operational weight for a given flight segment.

National Simulator Program Manager (NSPM)—the FAA manager responsible for the overall administration and direction of

the National Simulator Program (NSP), or a person approved by that FAA manager.

Near Limiting Performance—the performance level the operating engine must be required to achieve to have sufficient power to land a helicopter after experiencing a single engine failure during takeoff of a multiengine helicopter. The operating engine must be required to operate within at least 5 percent of the maximum RPM or temperature limits of the gas turbine or power turbine, or operate within at least 5 percent of the maximum drive train torque limits. Near limiting performance is based on the existing combination of density altitude, temperature, and helicopter gross weight.

Nominal—the normal operating configuration, atmospheric conditions, and flight parameters for the specified flight segment.

Non-Normal Control—a term used in reference to Computer Controlled Aircraft. It is the state where one or more of the intended control, augmentation, or protection functions are not fully working. Note: Specific terms such as ALTERNATE, DIRECT, SECONDARY, or BACKUP may be used to define an actual level of degradation.

Normal Control—a term used in reference to Computer Controlled Aircraft. It is the state where the intended control, augmentation, and protection functions are fully working.

Objective Data—quantitative data, acceptable to the NSPM, used to evaluate the FSTD.

Objective Test—a quantitative measurement and evaluation of FSTD performance.

Pitch—the airplane attitude with respect to, or around, the lateral axis expressed in degrees.

Power Lever Angle (PLA)—the angle of the pilot's primary engine control lever(s) on the flight deck. This may also be referred to as THROTTLE or POWER LEVER.

Predicted Data—estimations or extrapolations of existing flight test data or data from other simulation models using engineering analyses, engineering simulations, design data, or wind tunnel data.

Protection Functions—systems functions designed to protect an airplane from exceeding its flight maneuver limitations.

Pulse Input—a step input to a control followed by an immediate return to the initial position.

Qualification Level—the categorization of an FSTD established by the NSPM based on the FSTDs demonstrated technical and operational capabilities as prescribed in this part.

Qualification Performance Standard (QPS)—the collection of procedures and criteria used when conducting objective and subjective tests, to establish FSTD qualification levels. The QPS are published in the appendices to this part, as follows: Appendix A, for Airplane Simulators; Appendix B, for Airplane

Flight Training Devices; Appendix C, for Helicopter Simulators; Appendix D, for Helicopter Flight Training Devices; Appendix E, for Quality Management Systems for Flight Simulation Training Devices; and Appendix F, for Definitions and Abbreviations for Flight Simulation Training Devices.

Qualification Test Guide (QTG)—the primary reference document used for evaluating an aircraft FSTD. It contains test results, statements of compliance and capability, the configuration of the aircraft simulated, and other information for the evaluator to assess the FSTD against the applicable regulatory criteria.

Quality Management System (QMS)—a flight simulation quality-systems that can be used for external quality-assurance purposes. It is designed to identify the processes needed, determine the sequence and interaction of the processes, determine criteria and methods required to ensure the effective operation and control of the processes, ensure the availability of information necessary to support the operation and monitoring of the processes, measure, monitor, and analyze the processes, and implement the actions necessary to achieve planned results.

Real-World Airport—as used in this part in reference to airport visual models, a computer generated visual depiction of an existing airport.

Representative—when used as an adjective in this part, typical, demonstrative, or characteristic of, the feature being described. For example, “representative sampling of tests” means a sub-set of the complete set of all tests such that the sample includes one or more of the tests in each of the major categories, the results of which provide the evaluator with an overall understanding of the performance and handling characteristics of the FSTD.

Reversible Control System—a control system in which movement of the control surface will backdrive the pilot’s control on the flight deck.

Roll—the airplane attitude with respect to, or around, the longitudinal axis expressed in degrees.

Set of Aircraft—aircraft that share similar handling and operating characteristics, similar operating envelopes, and have the same number and type of engines or powerplants.

Sideslip Angle—the angle between the relative wind vector and the airplane plane of symmetry. (Note: this definition replaces the current definition of “sideslip.”)

Simulation Quality Management System (SQMS)—the elements of a quality management system for FSTD continuing qualification.

Snapshot—a presentation of one or more variables at a given instant of time.

Special Evaluation—an evaluation of the FSTD for purposes other than initial, upgrade, or continuing qualification. Cir-

cumstances that may require a special evaluation include movement of the FSTD to a different location, or an update to FSTD software or hardware that might affect performance or flying qualities.

Sponsor—a certificate holder who seeks or maintains FSTD qualification and is responsible for the prescribed actions as prescribed in this part and the QPS for the appropriate FSTD and qualification level.

Statement of Compliance and Capability (SOC)—a declaration that a specific requirement has been met and explaining how the requirement was met (e.g., gear modeling approach, coefficient of friction sources). The SOC must also describe the capability of the FSTD to meet the requirement, including references to sources of information for showing compliance, rationale to explain how the referenced material is used, mathematical equations and parameter values used, and conclusions reached.

Step Input—an abrupt control input held at a constant value.

Subjective Test—a qualitative assessment of the performance and operation of the FSTD.

Surge—FSTD movement with respect to or along the longitudinal axis.

Sway—FSTD movement with respect to or along the lateral axis.

T_f—Total time of the flare maneuver.

T_i—Total time from initial throttle movement until a 10% response of a critical engine parameter.

T_r—Total time from initial throttle movement to an increase of 90% of go around power or a decrease of 90% from maximum take-off power.

Time History—a presentation of the change of a variable with respect to time.

Training Program Approval Authority (TPAA)—a person authorized by the Administrator to approve the aircraft flight training program in which the FSTD will be used.

Training Restriction—a temporary condition where an FSTD with missing, malfunctioning, or inoperative (MMI) components may continue to be used at the qualification level indicated on its SOQ, but restricted from completing the tasks for which the correct function of the MMI component is required.

Transport Delay or “Throughput”—the total FSTD system processing time required for an input signal from a pilot primary flight control until motion system, visual system, or instrument response. It is the overall time delay incurred from signal input to output response. It does not include the characteristic delay of the airplane simulated.

Update—an improvement to or modernization of the quality or the accuracy of the FSTD without affecting the qualification level of the FSTD.

Upgrade—the improvement or enhancement of an FSTD for the purpose of achieving a higher qualification level.

Validation Data—objective data used to determine if the FSTD performance is within the tolerances prescribed in the QPS.

Validation Test—an objective test where FSTD parameters are compared to the relevant validation data to ensure that the FSTD performance is within the tolerances prescribed in the QPS.

Visual Data Base—a display that may include one or more airport models.

Visual System Response Time—the interval from a control input to the completion of the visual display scan of the first video field containing the resulting different information.

Yaw—the airplane attitude with respect to, or around, the vertical axis expressed in degrees.

3. Abbreviations

AFM Airplane Flight Manual.
AGL Above Ground Level (meters or feet).
AOA Angle of Attack (degrees).
APD Aircrew Program Designee.
CCA Computer Controlled Aircraft.
cd/m² candela/meter², 3.4263 candela/m² = 1 ft-Lambert.
CFR Code of Federal Regulations.
cm(s) centimeter, centimeters.
daN decaNewtons, one (1) decaNewton = 2.27 pounds.
deg(s) degree, degrees.
DOF Degrees-of-freedom.
eMQTG Electronic Master Qualification Test Guide.
EPR Engine Pressure Ratio.
FAA Federal Aviation Administration (U.S.).
FATO Final Approach and Take Off area
fpm feet per minute.
ft foot/feet, 1 foot = 0.304801 meters.
ft-Lambert foot-Lambert, 1 ft-Lambert = 3.4263 candela/m².
g Acceleration due to Gravity (meters or feet/sec²); 1g = 9.81 m/sec² or 32.2 feet/sec².
G/S Glideslope.
IATA International Airline Transport Association.
ICAO International Civil Aviation Organization.
IGE In ground effect.
ILS Instrument Landing System.
IOS Instructor Operating Station.
IQTG International Qualification Test Guide.
km Kilometers; 1 km = 0.62137 Statute Miles.
kPa KiloPascal (Kilo Newton/Meters²). 1 psi = 6.89476 kPa.
kts Knots calibrated airspeed unless otherwise specified, 1 knot = 0.5148 m/sec or 1.689 ft/sec.
lb(s) pound(s), one (1) pound = 0.44 decaNewton.
LDP Landing decision point.
MQTG Master Qualification Test Guide
M,m Meters, 1 Meter = 3.28083 feet.
Min(s) Minute, minutes.

MLG Main Landing Gear.

Mpa MegaPascals (1 psi = 6894.76 pascals).

ms millisecond(s).

N NORMAL CONTROL Used in reference to Computer Controlled Aircraft.

nm Nautical Mile(s) 1 Nautical Mile = 6,080 feet.

NN NON-NORMAL CONTROL Used in reference to Computer Controlled Aircraft.

N1 Low Pressure Rotor revolutions per minute, expressed in percent of maximum.

N2 High Pressure Rotor revolutions per minute, expressed in percent of maximum.

N3 High Pressure Rotor revolutions per minute, expressed in percent of maximum.

NSPM National Simulator Program Manager.

NWA Nosewheel Angle (degrees).

OGE Out of ground effect.

PAPI Precision Approach Path Indicator System.

Pf Impact or Feel Pressure, often expressed as "q."

PLA Power Lever Angle.

PLF Power for Level Flight.

psi pounds per square inch.

QPS Qualification Performance Standard.

QTG Qualification Test Guide.

RAE Royal Aerospace Establishment.

R/C Rate of Climb (meters/sec or feet/min).

R/D Rate of Descent (meters/sec or feet/min).

REIL Runway End Identifier Lights.

RVR Runway Visual Range (meters or feet).

s second(s).

sec(s) second, seconds.

sm Statute Mile(s) 1 Statute Mile = 5,280 feet.

SMGCS Surface Movement Guidance and Control System.

SOC Statement of Compliance and Capability.

SOQ Statement of Qualification.

TIR Type Inspection Report.

TLOF Touchdown and Loft Off area.

T/O Takeoff.

VASI Visual Approach Slope Indicator System.

VGS Visual Ground Segment.

V₁ Decision speed.

V₂ Takeoff safety speed.

V_{mc} Minimum Control Speed.

V_{mca} Minimum Control Speed in the air.

V_{mcg} Minimum Control Speed on the ground.

V_{mc1} Minimum Control Speed—Landing.

V_{mu} The speed at which the last main landing gear leaves the ground.

V_R Rotate Speed.

V_S Stall Speed or minimum speed in the stall.

WAT Weight, Altitude, Temperature.

END QPS REQUIREMENTS

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